इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 6701 (1985): Tungsten filament miscellaneous electric lamps [ETD 23: Electric Lamps and their Auxiliaries]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 6701 - 1985
(Reaffirmed 1996)

Indian Standard
SPECIFICATION FOR TUNGSTEN FILAMENT MISCELLANEOUS ELECTRIC LAMPS
(*First Revision*)

First Reprint MAY 1997

UDC 621.326 7 | 669 27 |

© *Copyright* 1986

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN. 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr6

June 1986

AMENDMENT NO. 1 FEBRUARY 2003
TO
IS 6701: 1985 SPECIFICATION FOR TUNGSTEN FILAMENT MISCELLANEOUS ELECTRIC LAMPS

(*First Revision*)

(*Page* 6, *clause* **3.1,** *line 2*) — Substitute 'IS 1112 (Part 1) : 1989* and IS 1112 (Part 2) : 1989* *for* 'IS : 1112 - I963*'.

(*Page* 6, *foot note, line* 1) — Substitute the following for the existing:

*Glass shells for general lighting service lamps : Part 1 60 to 80 mm shell diameter (*second revision*).

Part 2 81 to 130 mm shell diameter (*second revision*)

(*Page* 13, *clause* **A-1.1,** *Table, row* 3) — Substitute the following for the existing:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Decorative Lamp	230, 240. 250	15 *Max*	B22/25 × 26 or E 27/27	45	Frosted	-	-	72	74

(*Page* 15, *clause* **C-2.1,** *Table* 1A, *row* 5) — Substitute the following for the existing:

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Decorative Lamp	15 (*Max*)	—	120 (*Max*)	120 (*Max*)	120 (*Max*)	-

(ET23)

Reprography Unit, BIS. New Delhi. India

AMENDMENT NO. 2 JANUARY 2006
TO
IS 6701 : 1985 SPECIFICATION FOR TUNGSTEN FILAMENT MISCELLANEOUS ELECTRIC LAMPS

(*First Revision*)

(*Page* 4, *clause* **1.1,** *line* 3) — Add 'decorative lamps' after 'night lamps,'.

(*Page* 6, *clause* **3.3.3**) — Substitute the following for the existing:

'Insulation resistance between the shell of the cap and the contacts of bayonet capped lamps, or between the shell and the insulated skirt of skirted Edison screw capped lamps, shall be not less than 2 MΩ. Insulation resistance measurements shall be carried out with suitable test equipment using a d.c. voltage of 500 V. Measurements are made on finished lamps. The lamps, if necessary, shall be aged at their rated voltage for 1 h.'

(*Page* 12, *clause* **A-1.1,** *line* 7) — Add the following after this line:

"Decorative lamps — lamp ref *DL*."

[*Page* 13, *clause* **A-1.1,** *Table, row* 3 (*see also Amendment No.* 1)] — Substitute the following for the existing:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
DL & *NL*	230, 240, 250	15 (*Max*)	1322/25 × 26 or E 27/27	51	Frosted/Coloured (Inside Coated) Natural Colour & Clear	-	-	-	-

[*Page* 15, *clause* **C-2.1,** *Table* 1A, *row* 5 (*see also Amendment No.* 1)] — Substitute the following for the existing:

(1)	(2)	(3)	(4)	(5)	(6)	(7)
DL	15 (*Max*)	-	120 (*Max*)	120 (*Max*)	120 (*Max*)	-
NL	15 (*Max*)	-	75 (*Max*)	75 (*Max*)	75 (*Max*)	-

(ET 23)

Reprography Unit, BIS, New Delhi, India

IS : 6701 - 1985

Indian Standard

SPECIFICATION FOR TUNGSTEN FILAMENT MISCELLANEOUS ELECTRIC LAMPS

(*First Revision*)

Electric Lamps and Accessories Sectional Committee, ETDC 23

Chairman	*Representing*
DR S. R. DAS	National Physical Laboratory (CSIR), New Delhi
Members	
SHRI K. S. SARMA (*Alternate* to Dr S. R. Das)	
SHRI G. K. AGARWAL	Bajaj Electricals Ltd, Bombay
SHRI R. K. PANDITA (*Alternate*)	
SHRI S. R. ANAND	Sylvania & Laxman Ltd, New Delhi
SHRI V. K. SOOD (*Alternate*)	
SHRI R. S. ARORA	Directorate General of Supplies and Disposals. New Delhi
SHRI S. KRISHNA (*Alternate*)	
SHRI A. AUGUSTINE	HMT Ltd, Lamp Division. Hyderabad
SHRI M. ALAGAPPAN (*Alternate*)	
SHRI B. R. BADAMI	Mysore Lamp Works, Bangalore
SHRI P. K. BANDYOPADHYAY	Peico Electronics & Electricals Ltd, Bombay
SHRI P. K. SANYAL (*Alternate*)	
SHRI G. BHATTACHARJEE	National Test House, Calcutta
SHRI N. S. CHARI	Crompton Greaves Ltd, Bombay
SHRI V. K. MAJUMDAR (*Alternate*)	
SHRI P. K. CHATTERJEB	Electric Lamp Manufacturers (India) Pvt Ltd, Calcutta
SHRI M. M. BANDYOPADHYAY (*Alternate*)	
CHIEF ENGINEER (ELECTRICAL)-1	Central Public Works Department. New Delhi
SURVEYOR OP WORKS I (ELEC) (*Alternate*)	
DEPUTY DIRECTOR (DTD)	Central Electricity Authority, New Delhi
DEPUTY GENERAL MANAGER	Posts and Telegraphs Department, Jabalpur
DIVISIONAL ENGINEER (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1986
BUREAU OF INDIAN STANDARDS
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act,

(*Continued from page* 1)

Members	*Representing*
DIRECTOR OF MINES SAFETY (ELECT)	Directorate General of Mines Safety, Dhanbad
DEPUTY DIRECTOR OF MINES SAFETY, SG (B) (*Alternate*)	
DR S. N. DHINGRA	The Miniature Bulb Industries (India) Pvt Ltd, Dehra Dun
SHRI V. S. CHHIBBAR (*Alternate*)	
SHRI A. N. GHOSH	The Development Commissioner, Small Scale Industries, New Delhi
SHRI A. K. GOGIA (*Alternate*)	
SHRI S. D. GUPTA	APAR Pvt Ltd, Nadiad
SHRI M. M. SHARMA (*Alternate*)	
SHRI VIMAL K. GUPTA	Auto Lamps Ltd, Faridabad
SHRI S. C. KHERA (*Alternate*)	
JOINT DIRECTOR STANDARD (ELEC)-4	Research Designs and Standards Organization (Ministry of Railways), Lucknow
ASSISTANT DIRECTOR (ELEC)-D1 (*Alternate*)	
SHRI R. KAMAT	Bombay Electric Supply and Transport Undertaking, Bombay
SHRI P. S. VAIDYA (*Alternate*)	
SHRI G. L. KESWANI	Directorate General of Technical Development, New Delhi
SHRI L. GOPALAKRISHNAN (*Alternate*)	
CDR A. K. MATHUR	Naval Headquaters, Ministry of Defence
LT R. K. SANDAL (*Alternate*)	
SHRI MOHAN SINGH	Ministry of Defence (DGI). New Delhi
SHRI R. G. SHARMA (*Alternate*)	
SHRI S. P. NIYOGI	Directorate of Technical Development and Production (Air), Ministry of Defence, New Delhi
SHRI J. M. REWALLIWAR (*Alternate*)	
SHRI S. C. RASTOGI	Bengal Lamps Ltd, Calcutta
SHRI AJIT K. ROHATGI	Pradip Lamp Works, Patna
SHRI V. P. ROHATGI (*Alternate*)	
SHRI P. N. SRINIVASAN	PNS Lighting Design and Consultancy, Bangalore
SHRI G. VENKATESAN	Electric Lamp and Component Manufacturers' Association of India, Bangalore
SHRI R. P. MITHAL (*Alternate*)	
SHRI S. P. SACHDEV, Director (Elec tech)	Director General, ISI (*Ex-officlo Member*)

Secretary

SHRI SUKH BIR SINGH
Deputy Director (Elec tech), ISI

Indian Standard

SPECIFICATION FOR TUNGSTEN FILAMENT MISCELLANEOUS ELECTRIC LAMPS

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 10 September 1985, after the draft finalized by the Electric Lamps and Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 Tungsten filament general service electric lamps are covered by IS : 418-1978*. This standard is intended to cover special purpose tungsten filament electric lamps. This standard was first published in 1972 and this revision has been undertaken with a view to aligning relevant clauses of this specification with IS : 418-1978* and include new types of special purpose tungsten filament lamps which have since been developed in the country.

0.3 The designation and dimensions of the caps to be fitted to the lamps are the same as those recommended in the IEC Pub 61 - 1 (1969) Lamps caps and holders together with gauges for the control of interchangeability and safety: Part 1 Lamp caps, published by the International Electrotechnical Commission.

0.4 This standard states the technical requirements for the lamps in question, and the methods of test to be used in determining the quality and interchangeability of the lamps on a scientific basis and their safety in use, in an endeavour to maintain the interests of the purchaser and the manufacturer.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2 -1960†. The number of significant places retained in the rounted off value should be the same as that of the specified value in this standard.

---

*Specification for tungsten filament general service electric lamps (*third revision*)

†Rules for rounding off numercial values (*revised*).

1. SCOPE

1.1 This standard covers the requirements and methods of test for tungsten filament incandescent lamps used for navigation, road traffic control electric light signals, night lamps, directional sport lighting and flood lighting.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Type — This term denotes lamps which, independent of the type of the cap, are identical in photometric and electrical rating.

2.2 Batch — This term denotes all the lamps of one type put forward at one time for test for acceptance.

2.3 Inspection Test Quantity (ITQ) — The number of lamps to be tested with the object of determining the acceptability of the batch as to marking mechanical and physical requirements.

2.4 Rating Test Quantity (RTQ) — The number of lamps to be tested with the object of determining the acceptability of the batch as to initial readings.

2.5 Life Test Quantity (LTQ) — The number of lamps to be tested with the object of determining the acceptability of the batch as to life.

2.6 Light-Centre Length — The light-centre length is the distance from the geometrical centre of the filament to the contact plate of the cap including the solder.

NOTE — This definition applies whichever type of cap is used.

2.7 Lumen — The lumen is the unit of luminous flux. It is equal to the flux emitted in a solid angle of one steradian by an uniform point source of one candela.

NOTE — The candela (abbreviation: cd) is the unit of luminous intensity. It is of magnitude such that the luminance of a full radiator at the temperature of solidification of platinum is 60 units of luminous intensity per square centimetre.

2.8 Initiál Readings — The initial readings are the photometric and electrical measurements made at the end of the ageing period.

2.9 Life — The life of a lamp is, the number of hours it operates to 'burn out' or to any other criterion of life performance laid down in this standard.

2.10 Beam Spread Angle — Beam spread angle is twice the angle between the beam axis and the direction where the luminous intensity is 50 percent of that in the beam centre. This is pictorially represented in Fig. 1.

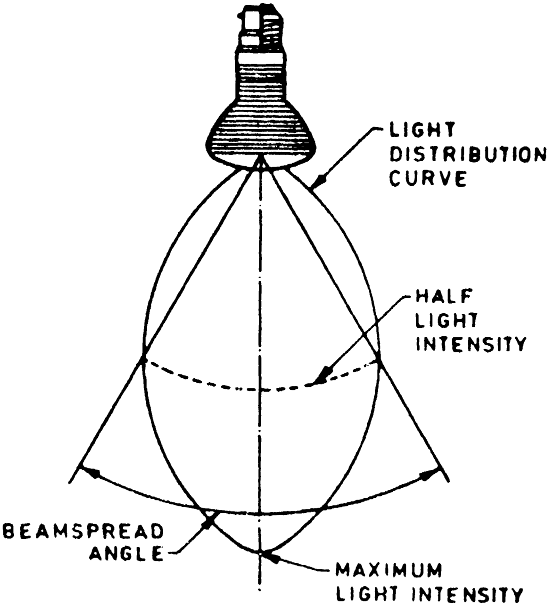


FIG. 1 BEOMSPREAD

2.11 Rated Voltage — The voltage marked on the lamp.

2.12 Rated Wattage — The wattage marked on the lamp.

2.13 Rated Lumens — The lumens declared.

2.14 Luminous Intensity — Luminous flux per unit solid angle in a specifiic direction $\left(\frac{d\phi}{dw}\right)$.

2.15 Rated Peak Luminous Intensity at Beam Centre — The luminous intensity in candelas declared at beam centre.

3. REQUIREMENTS FOR MECHANICAL AND PHYSICAL CHARACTERISTICS

3.0 General — Lamps shall be so designed and constructed that in all normal and accepted use their performance is reliable and without danger to the user or surroundings. In general, compliance is checked by carrying out all the tests specified.

3.1 Glass Shell — The glass shells shall be free from defects detrimental to service and shall comply with IS : 1112 - 1963* wherever applicable.

3.2 Lamp Dimensions — The lamps shall comply with the requirements specified in Appendix A for dimensions, interchangeability and safety.

3.3 Caps

3.3.1 The dimensions of the cap on the completed lamp shall comply with the requirements given in IS : 9206 - 1979†.

3.3.2 The shell of the cap shall be of aluminium, brass or other suitable material. Caps shall be so constructed and attached to the bulbs that they will withstand the torque specified in Appendix A, both during inspection test and at the end of the life test.

3.3.3 The insulation resistance between the shell of the bayonet cap and the contact shall be not less than 50 megohms. The test shall be carried out immediately after the ageing of the lamp (approximately 1 hour at rated voltage) to ensure proper drying and the measurements shall he made after the application of dc voltage of 500 V. Continuously far one minute.

3.3.3.1 If the insulation resistance value is below the requirements of **3.3.3,** then additional test shall be done before ageing. The lamps shall be removed from their wrappers, stored in dry surroundings for not less than 48 hours and the external surface shall be wiped with a dry cloth. In case the insulation resistance is still found to be insufficient, the lamp shall be stored in a warm dry atmosphere for a week and then retested for insulation.

3.4 Solder — The solder shall not prevent proper engagement of the cap in the holder.

NOTE — It is not essential that the whole surface of the eyelet should be covered with solder, provided there is good electrical cantact between the lead-in-wire and the eyelet, and the projecting portion of the wire, if any, above the solder is not more than 1 mm.

4. SAMPLING

4.1 Principles of Sampling— The lamps for testing shall be selected in accordance with a mutually agreed method such as to ensure proper representation (*see* Appendix B).

4.1.1 In order to cover the risk of accidental breakage, a certain number of lamps, in addition to the test quantity, shall be selected. These lamps shall only be substituted for lamps of the test quantities if necessary to

---

*Specification for glass shells for general lighting service lamps (*first revision*).

†Dimensions of caps for tungsten filament general service electric lamps.

make up the required quantities for the tests. It is not necessary to replace an accidentally broken lamp if the result of the test (approval or rejection) is not affected by its replacement, provided the required quantity of lamps for the following test is available. If replaced, such a broken lamp shall be neglected in calculating the test result.

NOTE — Accidentally broken lamps include, for example, lamps becoming defective during handling and transportation and also lamps becoming defective for reasons which are not connected with a normal procedure of testing for the measurement of lumens and watts according to 6.1.5.

4.2 Inspection Test Quantity (ITQ) — Inspection test quantity shall be as follows:

a) For lamps having wattage less than 75:	
i) Normal for batch size up to and including 10 000 lamps	35
ii) Special for batch size exceeding 10 000 lamps	70
b) For lamps having wattage 75 and above	25

4.3 Rating Test Quantity (RTQ) — From the lamps which have passed the inspection test, there shall be selected at random a RTQ as follows:

a) For lamps having wattage less than 75:	
i) Normal for batch size up to and including 10 000 lamps	25
ii) Special for batch size exceeding 10 000 lamps	50
b) For lamps having wattage 75 and above	20

4.4 Life Test Quantity (LTQ) — From the lamps which have passed the rating test, there shall be selected at random a LTQ as follows:

a) For lamps having wattage less than 75	20
b) For lamps having wattage 75 and above	15

5. MARKING

5.1 The lamps shall be distinctly and indelibly marked at any suitable position with the following information:

a) The mark of the manufacturer,

b) The rated volts (marked 'V' or volts),

c) The rated Watts (marked 'W' or watts),

d) 'Gas filled' or 'Gas' when the bulb is gas filled, and 'vacuum' or 'VAC in case of vacuum, and

e) Country of manufacture.

NOTE — Marking item (c) is not mandatory for night light lamps. Marking item (d) though preferable is not mandatory.

5.2 BIS Certification Marking

The product may also be marked with Standard Mark.

5.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6. CONDITIONS OF TEST AND REQUIREMENTS

6.1 Conditions of Testing

6.1.1 *Position of Burning*—For the purpose of the test for initial readings, the lamps shall burn in the vertical position with cap up. For measurement of luminous intensity in case of flood light lamps, they can burn in horizontal or any other suitable position. For life test, however, they shall burn in the position in which they are expected to burn during their normal operation except, however, in such cases where normal operating position is universal they shall burn during life test vertically with cap up. The lamp holders axis on the test racks shall not deviate from the intended lamp operating axis by more than 5°.

6.1.2 *Lamp Holders*—Lamp holders on life test racks shall be of sturdy construction and shall be designed to ensure adequate electrical contacts and to prevent over heating.

The voltage drop between the point of measurement on the supply line and the holder contacts shall not exceed 0.1 percent of the test voltage.

For bayonet lampholders, the cap shall be substantially at the same potential as the contact which is not connected to the main supply lead equipped with a fuse.

NOTE 1 — It is recommended that lampholders of the spring loaded plunger type should not be used for prolonged testing. The torque imposed on insertion or extraction of the lamp shall not exceed the values specified in Appendix A for the relevant lamp cap. The cap temperature in operation shall not exceed 210°C.

NOTE 2 — Lamps shall not be operated at excessive ambient temperature neither shall there be undue heating of a lamp by others lamps.

6.1.3 *Ageing* — Before the initial readings are taken as given in Appendix C, lamps shall be aged.

6.1.4 *Photometry* — Measurements shall be carried out at the rated voltage with a suitable integrating photometer. Guidance can be taken from IS : 2407 - 1963*.

NOTE — Brief guidance regarding photometric measurements of luminous intensity of flood light lamps is given in Appendix D.

6.1.5 *Life Test Procedure*

6.1.5.1 *Test voltage* — The test voltage shall be a stable voltage (*see* **6.1.5.2**) between 100 percent and approximately 110 percent of the rated voltage, the value to be selected by mutual agreement.

The equivalent life for rated volts shall be determined in accordance with the following equation:

$$L_0 = L\left(\frac{U}{U_0}\right)^n$$

where

L_o = life at rated voltage,

L = life at test voltage,

U_0 = rated voltage,

U = Average effective voltage during life test, and

n = 13 for vacuum lamps and 14 for gas-filled lamps.

The lamps shall be burned on alternating current at a frequency of a nominal value between 40 Hz and 60 Hz.

NOTE — In general, testing at voltages in excess of the rated voltage is practised mainly for reasons of economy.

6.1.5.2 *Voltage control* — The momentary fluctuation of the test voltage during the life test shall not exceed ± 1 percent, and the mean effective value of the test voltage during the life test shall be taken for the calculation given in **6.1.5.1.** The voltage shall be free from perceptible flicker.

NOTE — Mean effective value of the voltage shall be obtained by a suitable V^2 meter (*see* Appendix E).

6.1.5.3 *Switching 'on' and 'off'*— All lamps, excepting road traffic control electric signal lamps shall be switched off twice daily for periods of not less than 15 minutes, such periods not being considered as part of the burning hours of the lamp.

---

*Specification for photometric interrators.

NOTE — For road traffic control electric light signal lamps, the life test shall be done with on-off cycles of 60 seconds each.

6.1.5.4 *Measurements* — Lamps subjected to the life test shall be measured for lumens at the rated voltage at:

a) 750 hours ±25 hours in case of 1 000 hours rated life lamps, and

b) 1 550 hours ±25 hours in case of 2 500 hours rated life lamps,

or their equivalents if forced testing is used.

NOTE 1 — Maintenance values of lumen intensity for flood light lamps are under consideration.

NOTE 2 — In the case of nightlamps lumen maintenance test is not applicable.

6.1.5.5 *Termination of test* — The life test shall be considered to have terminated at:

a) 1 250 hours in case of 1 000 hours rated life lamps, and

b) 3 100 hours in case of 2 500 hours rated life lamps,

or their equivalents if forced testing is used.

6.2 Requirements of Ratings

6.2.1 *Initial Readings* — When measured at the rated voltage, the initial readings shall be in accordance with Appendix C

6.2.2 *Life Test Requirements* — The luminous flux (luminous intensity at beam centre in case of flood light lamps) when measured in accordance with **6.1.5.4** and the duration of life shall comply with the requirements given in Appendix F.

7. CONDITION OF COMPLIANCE

7.1 General — If any test quantity fails to satisfy any of the requirements of **7.2, 7.3** and **7.4,** the batch shall be rejected and no subsequent tests shall be carried out from the batch (*see also* Appendix G).

7.2 Mechanical, Physical and Marking Requirements — All the lamps chosen for *ITQ* as prescribed in **4.2** shall be tested for mechanical, physical and marking requirements (*see* **3.1** to **3.4** *and* **5**).

A batch shall be considered to comply with the requirements of this clause if the number of lamps failing does not exceed:

a) *For lamps having wattage less than 75:*

1) For a normal batch having *ITQ* of 35 lamps:

i) 3 for any one of the tests (**3.1** to **3.4** and **5**); and

ii) 7 for all the tests (**3.1** to **3.4** and **5**).

   2) For a special batch having *ITQ* of 70 lamps:
      i) 5 for any one of the tests (**3.1** to **3.4** and **5**); and
      ii) 12 for all the tests (**3.1** to **3.4** and **5**).

b) For lamps having wattage 75 and above. For a batch having *ITQ* of 25 lamps:
   1) 2 for any one of the tests (**3.1** to **3.4** and **5**); and
   2) 5 for all the tests (**3.1** to **3.4** and **5**).

7.3 Initial Ratings — All the lamps chosen for *RTQ* shall be tested for initial wattage, lumen (or luminous intensity at beam centre in case of floodlight 'amps). A batch shall be considered to comply with the requirements of initial ratings if:

a) For lamps having wattage less than 75:
   1) For a normal batch having *RTQ* of 25 lamps:
      i) the number of lamps whose wattage is above the maximum values specified in **C-2,** does not exceed 4; and
      ii) the number of lamps whose lumen values (or luminous intensity at beam centre in case of floodlight lamps) are below the minimum values specified in **C-4,** does not exceed 4.
   2) For a special batch having *RTQ* of 50 lamps:
      i) the number of lamps whose wattage is above the maximum values specified in **C-2,** does not exceed 7; and
      ii) the number of lamps whose lumen values (or luminous intensity at beam centre in case of floodlight lamps) are below the minimum values specified in **C-2** does not exceed 7.

b) For lamps having wattage 75 and above:

   For a batch having *RTQ* of 20 lamps:
   1) the number of lamps whose wattage is above the maximum value specified in **C-2,** does not exceed 3; and
   2) the number of lamps whose lumen values (or luminous intensity at beam centre in case of floodlight lamps) are below the minimum values specified in **C-2,** does not exceed 3.

7.4 Requirements for Specific Failures During Life Test — The test quantity of lamps, when tested in the normal operating position and at the specified test voltage, shall be deemed to have failed if more than one lamp out of 20 fails in a manner which causes breakage of the glass bulb.

7.5 Life Performance — Life test and measurement of lumens (or luminous intensity at beam centre in case of floodlight lamps) as per **6.1.5.4** shall be done on the samples chosen for *LTQ*. A batch shall be considered to comply if:

a) the average life of the *LTQ* attains the value set out in **F-1**;

b) the total number of lamps having lives shorter than:

  i) 700 hours (for 1 000 hours rated life lamps); and

  ii) 1 500 hours (for 2 500 hours rated life lamps),

together with those failing to pass the requirements for luminous flux/luminous intensity (as per **6.1.5.4**) for individual lamps, set out in **C-2** does not exceed 4 for lamps having wattage less than 75, and 3 for lamps having wattage 75 and above.

APPENDIX A

(*Clauses* 3.2, 3.3.2 *and* 6.1.2)

DIMENSIONS, CONTROL OF INTERCHANGEABILITY, SAFETY AND TORSION TEST

A-1. DIMENSIONS

A-1.1 The rated voltage, wattage, cap designation, bulb finish and dimensions of the lamps shall be as given below. For the purpose of this standard the lamps have been abbreviated as follows:

Navigation lamps — lamp ref *N*

Road traffic control electric light signal lamps — lamp ref *RS*

Night lamps — lamp ref *NL*

Flood light lamps — lamp ref *F*

LAMP REF	RATED VOLTS	RATED WATTS	CAPS FOR WHICH DIMENSIONS ARE GIVEN	BULB DIA (*Max*)	BULB FINISH	LIGHT CENTRE LENGTH		OVERALL LENGTH (*Max*)	
						Nominal	Tolerance	With Bayonet Cap	With Screw Cap
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	V	W		mm		mm	mm	mm	mm
	110	40,60	*B*-22/25 × 26 or *E*-27/27	66	Clear	84	±5	150	151·5
N	230, 240, 250	40,60		66	Clear	85·5	±5	150	151·5
RS	230, 240, 250	40,60		62	Clear	66·5	±2	108·5	110
NL	230, 240, 250	10 (*Max*)		51	Frosted/ coated /clear	–	–	–	–
F	230, 240, 250	40.60		65	Front frosted internal aluminium-coated	–	–	102·5	104
F	230, 240, 250	75,100, 150		97	Internal reflector type	–	–	135	136 5
F	230, 240, 250	150		127		–	–	175	176·5

NOTE 1 — All navigation lamps shall have squirrel cage filament construction. The filament shall be mounted concentrically about the axis of the cap.

NOTE 2 — Road signal lamps shall have single coil filaments and shall be made with reinforced construction.

NOTE 3 — Typical shape of reflector lamps is given in Fig. 2.

A-2. CONTROL OF INTERCHANGEABILITY AND SAFETY

A-2.1 Lamp caps shall meet the requirements given in IS : 9206 - 1979*.

---

*Dimensions of the cap for tungsten filament general service electric lamps.

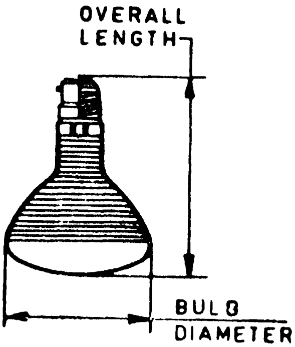


FIG 2 TYPICAL SHAPE OF REFLECOR — FLOOD LIGHT LAMPS

A-2.2 Requirements regarding danger from destruction of the lamps from internal causes are under consideration.

A-3. TORSION TEST

A-3.1 The torsion test shall be carried out using the special holders shown in Appendix G and fixed to a suitable torque testing machine with the following values of torque:

E 27 and *B* 22 Caps = 3 Nm

The torque shall not be applied suddenly, but shall be increased continuously from zero to the amount specified above.

APPENDIX B

(*Clause* 4.1)

SUGGESTED METHOD OF SELECTION

B-1. The method of selection of lamps is given in **B-2** which is limited up to lamps having wattage less than 75 watt. For reasons of economy, the test quantities for lamps of ratings 75 watt and above have been decreased.

B-2. BATCHES

B-2.1 Batches Consisting of 1 000 Lamps or Less — For batcnes consisting of less containers, lamps shall be selected from every container. For batches consisting of more than 10 containers, lamps shall be selected from at least one-half of the total number of containers in the batch, with a minimum of 10 containers.

B-2.2 Batches Consisting of More than 1 000 Lamps — As nearly as possible from one-third of the total number of containers in the batch, with a minimum of 10 containers.

APPENDIX C

(*Clauses* 6.1.3 *and* 6.2.1)

INITIAL READINGS

C-1. AGEING PERIOD

C-1.1 Initial readings shall be taken after an ageing period of approximately one hour at rated voltage.

C-1.2 The initial watts of individual lamps shall not exceed 104 percent of the rated watts ±0·5 W. In case of night lamps, however, lamp wattage shall not be more than 10 W.

C-2. RATED LUMENS

C-2.1 Rated lumens [rated luminous intensity (cd) at beam centre in case of flood light lamps] shall not be less than the values shown in Tables 1A and 1B.

TABLE 1A MINIMUM RATED LUMENS FOR NAVIGATION ROAD TRAFFIC CONTROL SIGNAL AND NIGHT LAMPS

LAMP REF	RATED WATTAGE	LUMENS				BEAM SPREAD (NOM)
		110V	230V	240V	250V	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
N	40	360	330	325	320	
N	60	560	530	525	520	
RS	40	—	240	235	235	
RS	60		390	385	380	
NL	10 (*Max*)	—	45 (*Max*)	45 (*Max*)	45 (*Max*)	—

NOTE — For lamps reference *see* A-1.1 of Appendix A.

TABLE 1B MINIMUM RATED LUMINOUS INTENSITY (cd) FOR FLOOD LIGHT LAMPS

LAMP REF	RATED WATTAGE	LUMINOUS INTENSITY (cd)			BEAM SPREAD
		230V	240V	250V	
(1)	(2)	(3)	(4)	(5)	(6)
F	40	450	450	450	30°
F	60	700	700	700	30°
E	75	800	800	800	35°
F	100	1 150	1 150	1 150	35°
F	150 (97 mm bulb dia)	1 900	1 900	1 900	35°
F	150 (125 mm bulb dia)	2 200	2 200	2 200	35°

NOTE — For lamp reference *see* A-1.1 of Appendix A

C-3. INITIAL LUMEN (LUMINOUS INTENSITY AT BEAM CENTRE IN CASE OF FLOOD LIGHT LAMPS) TOLERANCE

C-3.1 The initial values recorded for lumens or luminous intensity of individual lamps shall not be less than 93 percent of the rated lumens for flood light lamps.

NOTE — For flood light lamp tolerance limits for luminous intensity at beam centre are under consideration.

APPENDIX D

(*Clause* 6.1.4)

BRIEF GUIDANCE REGARDING PHOTOMETRIC MEASUREMENTS OF LUMINOUS INTENSITY OF FLOOD LIGHT LAMPS

D-1. This Appendix gives guidelines for the method of photometric measurements of the luminous intensity in a particular direction of an incandescent lamp, in comparison with an incandescent lamp, referred to as the standard lamp of known luminous intensity. The lamp under test and the standard lamp herein shall be of monoplane filament type for the measurement of luminous intensity and shall have a fairly uniform distribution of luminous intensity in all directions.

D-2. ELECTRICAL MEASURING EQUIPMENTS

D-2.1 Constant Voltage Power Source — The constant voltage power source shall be either dc or ac or 40 Hz to 60 Hz of nearly sinusoidal wave. The voltage shall be free from sudden variation as far as possible and its variation shall not exceed 1 percent of the specified voltage.

D-2.2 Instruments — Potential circuit of instruments connected across a lamp shall not draw more than 3 percent of the nominal running current of the lamps.

Instruments connected in series with the lamp shall have a sufficiently low impedance such that the voltage drop shall not exceed 2 percent of the nominal running lamp voltage.

Instruments shall be essentially free from wave form errors. When measuring the voltage or power of the lamp, the potential circuit of the instruments not in use shall be open. During the measurement of the lamp wattage, no correction shall be made for the wattmeter consumption (the circuit connection being made on the lamp side of the current coil).

The accuracy of the meters, when used for the test shall be not less than 0·5 percent of full scale values.

D-2.3 Circuits — A suitable electrical measuring circuit shall be used for the measurements. The leads to the lamp shall be separate for the voltmeter and ammeter and shall have a sufficient current capacity so as not to cause errors in the indications of the instruments used.

D-2.4 Photometer — Photometer measurement shall be made by means of the photo voltic cell photometer or photoelectric tube photometer. For the measurement of photoelectric current, circuits for the precise measurement of microcurrents shall be used.

D-3. MEASUREMENT OF LUMINOUS INTENSITY

D-3.1 The lamp and the photometer shall be placed on the photometer bench so that the line passing through the centre of the filament plane and the centre of the photometric receiving plane of the photometer will be horizontal and perpendicular to the respective planes. The distance between the both planes shall not be less than 10 times the maximum dimension of the glass bulb of the lamp and the photometric plane of the photometer, which ever the larger.

D-4. PHOTOMETRIC MEASUREMENT

D-4.1 This shall comply with either one of the following methods:

a) The distance between the filament plane of the lamp and the photometric receiving plane of the photometer is kept constant for both the standard lamp and the lamp under test and the luminous intensity of the lamp under test is obtained from the ratio of respective readings in each case.

b) The distance between the filament plane of the respective lamp and the photometric receiving plane of the photometer is adjusted so that the reading of the photometer is equal in both the standard lamp and the lamp under test and the luminous intensity of the lamp under test is obtained by applying the law of inverse square of distance.

APPENDIX E

(*Clause* 6.1.5.2)

BRIEF DESCRIPTION OF V^2 METER

E-1. The V^2 meters are based on the same principle as the normal single phase induction kilowatt-hour meters. The difference is that a fine-wired coil in series with a high resistance has been substituted for the normal current coil. The coil as well as the normal voltage coil are both connected in parallel to the mains.

E-2. As the speed of the rotation of the disc is proportional to the voltage on the voltage coil and the current in the current coil, and as the latter is proportional to the voltage, with the built-in resistance constant, the speed of rotation of the disc is proportional to the square of the voltage. Hence the reading per unit of time is proportional to the square of the voltage.

E-2.1 The measurement of the time is done by a close-work starting and stopping with voltage on and off. If the clock-work is of the synchronous type, it should be ensured that the frequency is correct. If it is of the electrically worked self starting type with a balance, it should be compared with a normal good watch adjusted in the normal way.

E-3. The accuracy of the V^2 meter depends on the steadiness of the voltage used. The accuracy is generally about 0·25 percent when the voltage used is within ±1 percent. In this respect the V^2 meter is more accurate than any recording voltmeter the accuracy of which is mostly not greater than 2 percent of the full-scale value.

APPENDIX F

[*Clauses* 6.2.2, 7.5 (a) *and* (b)]

LIFE PERFORMANCE

F-1. AVERAGE LIFE

F-1.1 The average life shall not be less than:

a) 1 000 hours for navigation and floodlight lamps, and

b) 2 500 hours for road traffic control electric light lamps and night light lamps.

However, when the *LTQ* is only 20 lamps, the average life obtained shall not be less than:

a) 960 hours for navigation and floodlight lamps, and

b) 2 250 hours for road traffic control signal lamps and night lamps.

F-1.2 For *LTQ* less than 20 lamps, the average life obtained, shall be subjected to the following allowances:

Number of Lamps in the Life Test	*Percentage Allowance in Average Life*
15	11

F-2. INDIVIDUAL LAMP REQUIREMENTS

F-2.1 A lamp shall have:

a) A life of not less than:
   - i) 700 hours in case of navigation and floodlight lamps,
   - ii) 1 500 hours in case of road traffic control signal lamps and night lamps;

b) a ratio of luminous flux when measured in accordance with **6.1.5.4** to the initial luminous flux expressed as a percentage shall not be less than the following values:

Rated Wattage	*Ratio in Percentage*	
	110 V	230 to 250 V
40 watts and above (excluding flood light lamps)	85	85

NOTE — Requirements for maintenance value for luminous intensity in the case of floodlight lamps are under consideration.

If a lamp does not comply with (b) above, it shall be considered to have failed at:

i) 690 hours in case of navigation and floodlight lamps, and

ii) 1490 hours in case of road traffic control signal lamps and night lamps.

F-3. POSITION OF BURNING DURING LIFE

F-3.1 Navigation lamps would burn vertical cap down, road traffic control electric light signal lamps would burn horizontal and night lamps and floodlight lamps vertical cap up position.

APPENDIX G

(*Clause* 7.1)

STATISTICAL BASIC OF THE TEST QUANTITIES AND THE CONDITIONS OF COMPLIANCE

G-1. The acceptance limits are such that there is a 0·975 probability of compliance with each condition provided that the bulk from which the sample is drawn contains approximately:

a) 3 percent failing any single requirement (**3.1** to **3.4** and **5**) and 10 percent failing the requirements combined,

b) 7 percent outside the requirements for initial readings, and

c) 8 percent failing the individual life requirements.

NOTE 1 — Because 0·975 probability of compliance applies to each condition separately, it follows that, at the specified level of quantity, the overall probability of compliance would be somewhat smaller (though by how much it is not possible to estimate closely).

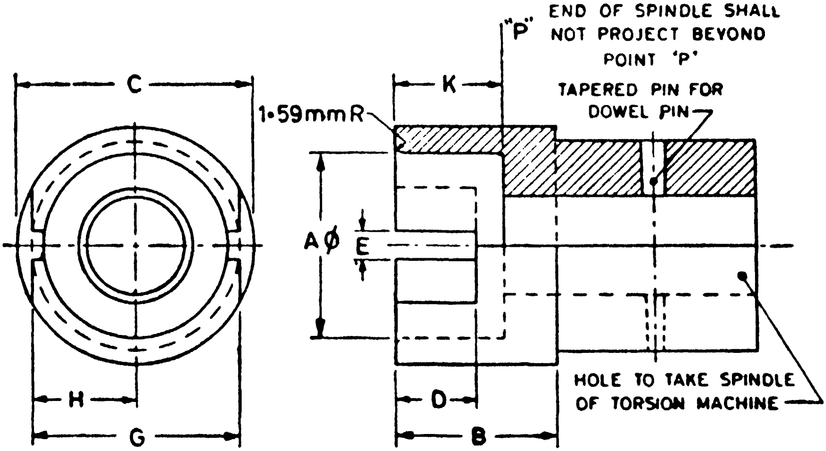
NOTE 2 — The method of sampling and basis for test quantities remain under consideration.

APPENDIX H

(*Clause* A-3 1)

HOLDERS FOR TORSION TEST

H-1. The dimensions of holders for torsion tests of the different lamp caps shall be as given in Fig. 3A and 3B.

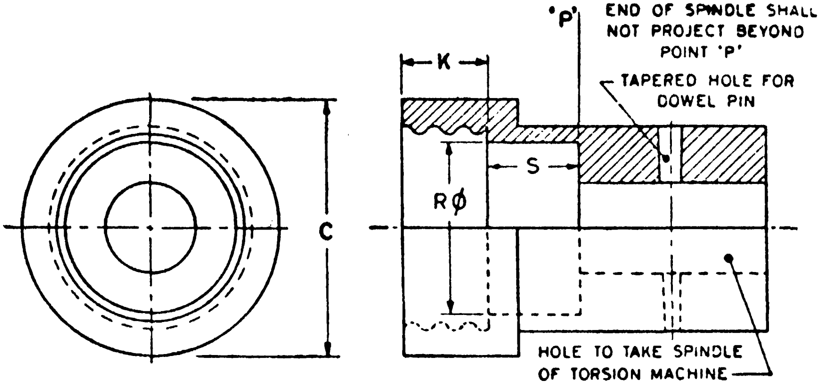

"P"
END OF SPINDLE SHALL NOT PROJECT BEYOND POINT 'P'
C
K
TAPERED PIN FOR DOWEL PIN
1·59mmR
AØ
E
H
G
D
B
HOLE TO TAKE SPINDLE OF TORSION MACHINE

Ref Letter	*Dimensions*	*Tolerance*
A	22·17	+0·03
B	19·05	±0·3
C	28·57	±0·3
D	9·52	±0·3
E	3·00	±0·17
G	24·61	±0·3
H	12·30	±0·3
K	12·70	±0·3

All dimensions in millimetres.

3A FOR BAYONET CAP B 22

FIG. 3 HOLDERS FOR TORSION TEST — *Contd*


'P'
END OF SPINDLE SHALL NOT PROJECT BEYOND POINT 'P'
K
TAPERED HOLE FOR DOWEL PIN
C
S
RØ
HOLE TO TAKE SPINDLE OF TORSION MACHINE

Ref Letter	*Dimensions*	*Tolerance*
C	33·02	±0·3
K	10·92	±0·03
O	23·01	±0·3
S	11·68	±0·3

All dimensions in millimetres.

3B FOR SCREW CAPS E 27

FIG. 3 HOLDERS FOR TORSION TEST

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

Central Laboratory:	Telephone
Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010	8-77 00 32

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	337 86 62
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43
Southern : C.I.T Campus, IV Cross Road, CHENNAI 600113	235 23 15
†Western Manakalaya E9, Behind Marol Telephone Exchange, Andhei (East), MUMBAI 400093	832 92 95

Branch Offices:

'Pushpak'. Nurmohamed Shaikh Marg Khanpur, AHMEDABAD 380001	550 13 48
‡Poenya Industrial Area, 1st Stage, Bangalore Tumkur Road BANGALORE 560008	839 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T. T Nagar, BHOPAL 462003	55 40 21
Plot No. 62-63. Unit VI. Ganga Nagar, BHUBANESHWAR 751001	40 36 27
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037	21 01 41
Plot No 43, Sector 16 A, Mathura Road, FARIDABAD 121001	8-28 88 01
Savitri Complex, 116 G T Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No 29, R G Barua Road, 5th By-lane, GUWAHATI 781003	54 11 37
5-8-58C, L N Gupta Marg, Nampally Station Road, HYDERABAD 500001	20 10 83
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001	37 29 25
117/418 B, Sarvodaya Nagar, KANPUR 208005	21 68 76
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	23 89 23
Patliputra Industrial Estate, PATNA 800013	26 23 05
T. C. No. 14/1421, University P. O. Palayam, THIRUVANANTHAPURAM 695034	6 21 17
NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010	52 51 71
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	32 36 35

---

*Sales Office is at 5 Chowringhee Approach, P. O. Princep Street, CALCUTTA 700072 27 10 85

†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007 309 65 28

‡Sales Office is at 'F' Block, Unity Building. Narashimaraja Square, BANGALORE 560002 222 39 71

Printed at New India Printing Press. Khurja, India